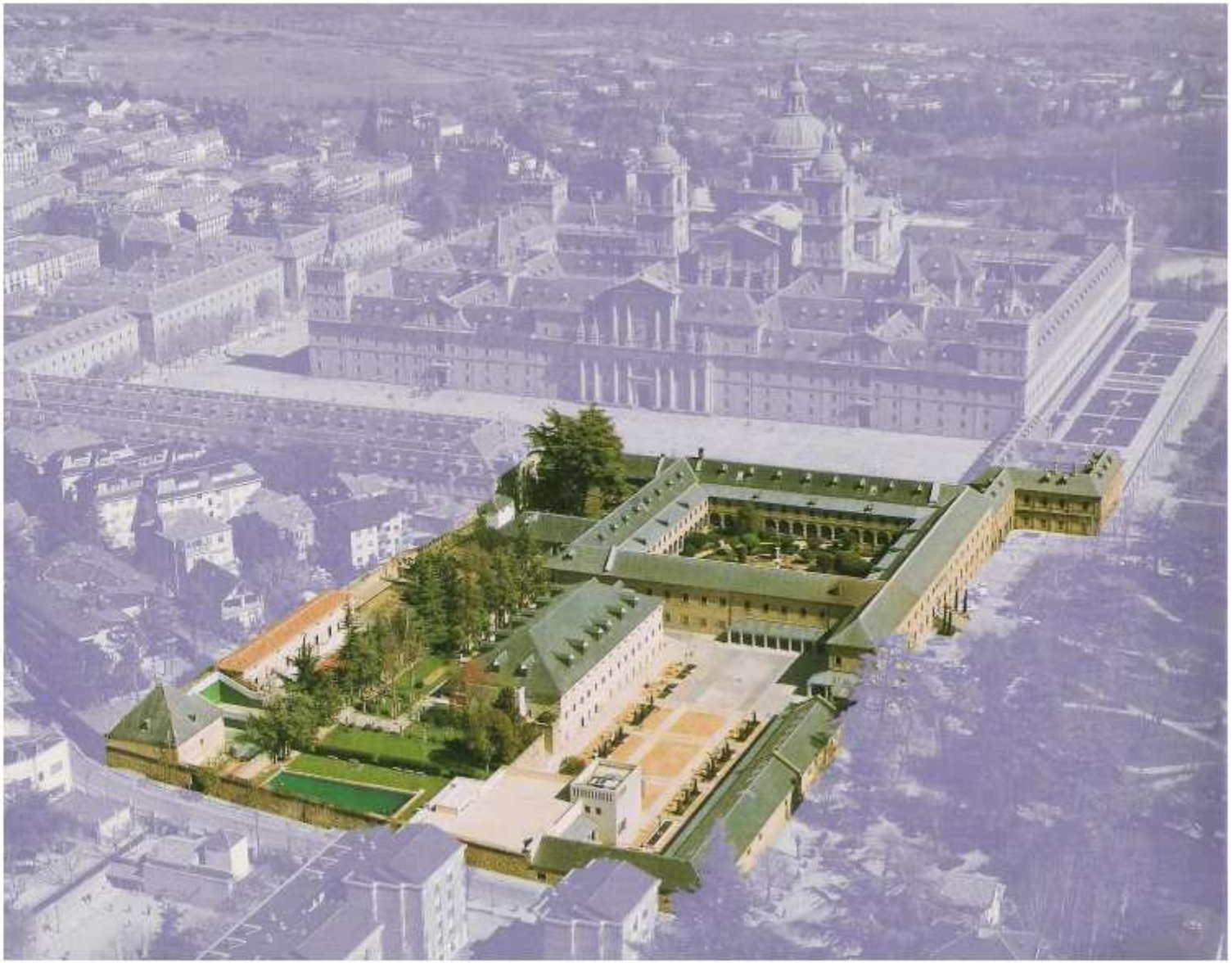
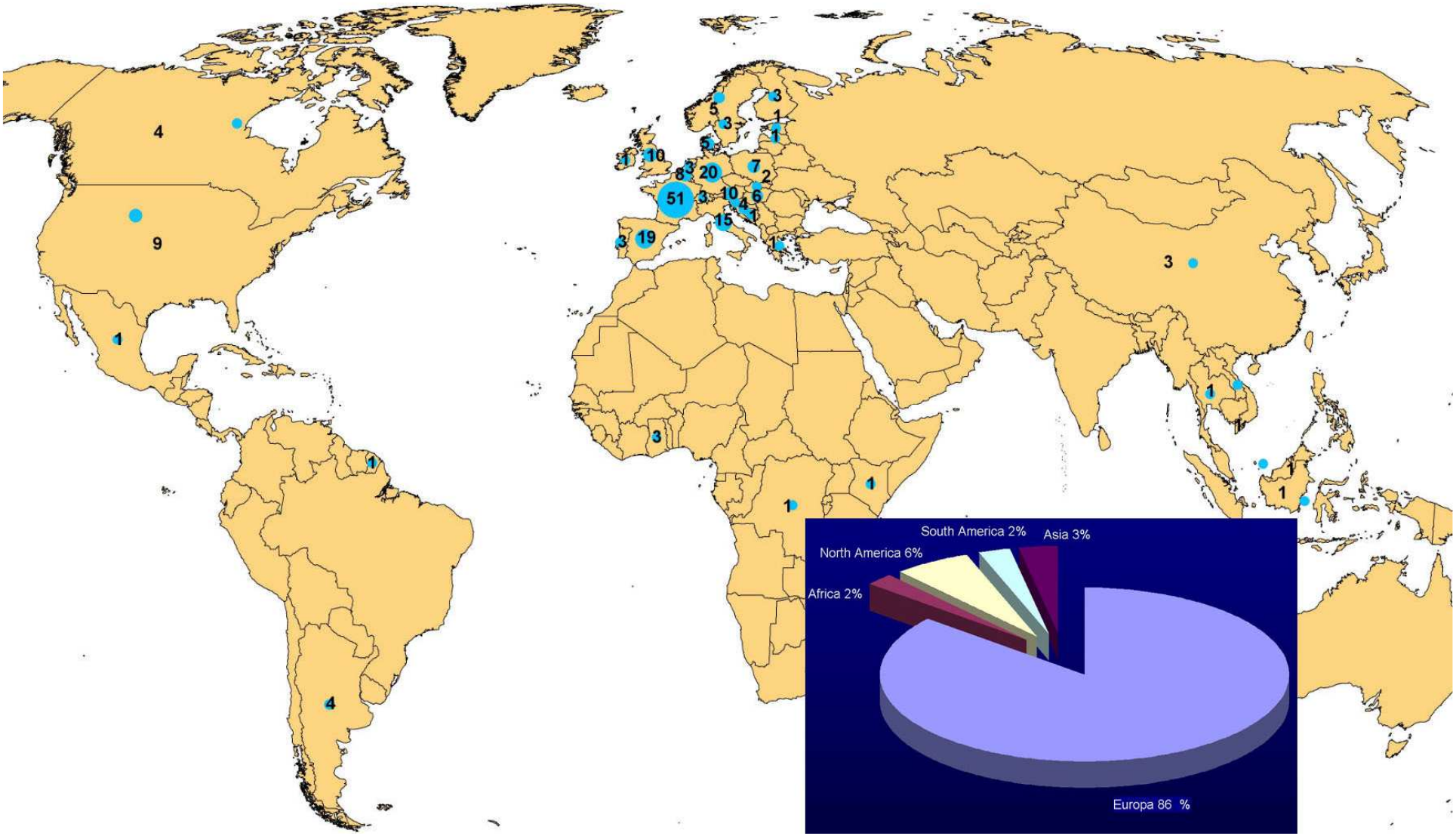
Evoltree - Final international scientific conference



Results

220 participants, from 37 countries
Summary soon to be published on Tree Genetics & Genomes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South America 2%
Asia 3%
North America 6%
Africa 2%
Europa 86 %

Themes

Phenomics under climate change

Population genomics of adaptive traits

Evolutionary responses to environmental change

Community responses to environmental change

Migration under climate change

Eco-regional trends in adaptation

New technologies in ecosystem genomics

Mitigation options

Implications for improving relevant policies – Stakeholders' event

Final Stakeholder Group meeting

10 June 2010, Escorial (Spain)

- Forest ecosystem genomic insights and conservation (Bruno Fady)

- Forest ecosystem genomics and sustainable forest management: use of forest reproductive material (Bernd Degen)

- Genomics and production aspects: linkages between Evoltree and Noveltree (Catherine Bastien)

Members of the Stakeholders Panel:

* Bruno Fady (INRA-Avignon, France)
* Bernd Degen (Johann Heinrich von Thünen-Institut, Germany)
* Catherine Bastien (INRA-Orleans, France)
* Lennart Ackzell (Federation of Swedish Forest Owners, Sweden)
* Kurt Ramskogler (LIECO GmbH & Co KG, Austria)
* Tore Skroppa (Norwegian Forest and Landscape Institute, Norway)
* Ricardo Alia (CIFOR-INIA, Spain)

Outputs

This scientific event showed that

- large catalogues of genes that are responsible for determining adaptive responses of forest ecosystems,

- more thinking is needed: eg, how genes move across landscapes through different mechanisms of dispersal, facilitating species migration under the pressure of environmental change,

- more interdisciplinarity needed; forest ecosystem genomics links 4 disciplines, ecology needs to be strengthened more

- further use of modeling is needed to be able to project future scenarios, filling the gaps in our knowledge and allowing application of current understanding to forest management.

Stakeholders'event

Stakeholders appreciated efforts made since the inception of the Evoltree project to engage the end users of the research findings produced

Topics that emerged from the comments of the Stakeholder Panel:

1. urge to implement coordinated efforts for the conservation and use of forest genetic diversity at national and international levels,

2. need to bring the scientific research findings to the attention of policy making fora (such as Forest Europe),

3.need to maintain the genetic diversity and adaptation capacity of existing forests,

4. need for guidelines on how to use, and possibly move, forest reproductive material in the face of climate change,

5. growing need for regulatory mechanisms for access and benefit sharing of forest genetic resources.

http://www.evoltree.eu/index.php/evoltree-final-conference

EVOLTREE
EVOLution of TREEs as drivers of terrestrial biodiversity

Welcome | Project | Research | e-Resources | Repository Centre | ISS | Dissemination | Mobility

EVOLTREE Final Conference

Hits: 767

The conference on "Forest Ecosystem Genomics and Adaptation" took place in San Lorenzo de El Escorial (49 Km from Madrid, Spain) from June 9th to 11th, 2010.

The aim of this international conference was to present new scientific findings in the area of ecosystem genomics, which addresses the structure and evolution of gene diversity at the population and community level. The conference focussed on the function and diversity of genes of adaptive significance in the context of climate change. Adaptation of forest ecosystems was analyzed from an evolutionary perspective and illustrated by examples on trees and their associated species.

The conference was a joint event co-organized by the research partners in the Network of Excellence EVOLTREE, funded by the EC 6th Framework Programme for Research. The event was open to the wide scientific community and had in its programme a dedicated session for policy makers and forest practitioners, where the implications of research findings to formulate relevant policies and implement sustainable forest management were discussed.

Downloads:

Book of Abstracts (3.11 MB)

Presentations and Info Material:

Day 1 - Population genomics, Phenomics under climate change

Day 2 - Eco-regional trends, New technologies, Mitigation options

Day 3 - Community responses, Evolutionary responses and Migration under climate change

Stakeholder Group Meeting

Next >

The Network of Excellence EVOLTREE is financially supported by the European Commission under the 7th Framework Programme for Research and Technology Development.

http://www.evoltree.eu/index.php/evoltree-final-conference/5349-day1

EVOLTREE Final Conference - Day 1

Plenary opening session

GLOBAL CHANGE AND FOREST GENETICS: ISSUES IN FUTURE FUNCTIONING OF POPULATIONS AND ECOSYSTEMS

Allen M. Solomon

Download (28.77 MB)

Population genomics

GENOME-WIDE ASSOCIATION STUDIES IN *ARABIDOPSIS*

Magnus Nordborg

Download (77.71 MB)

Phenomics under climate change

ASPEN PHENOMICS: PHENOLOGY, HERBIVORY AND METABOLISM

Stefan Jansson

Download (3.71 MB)

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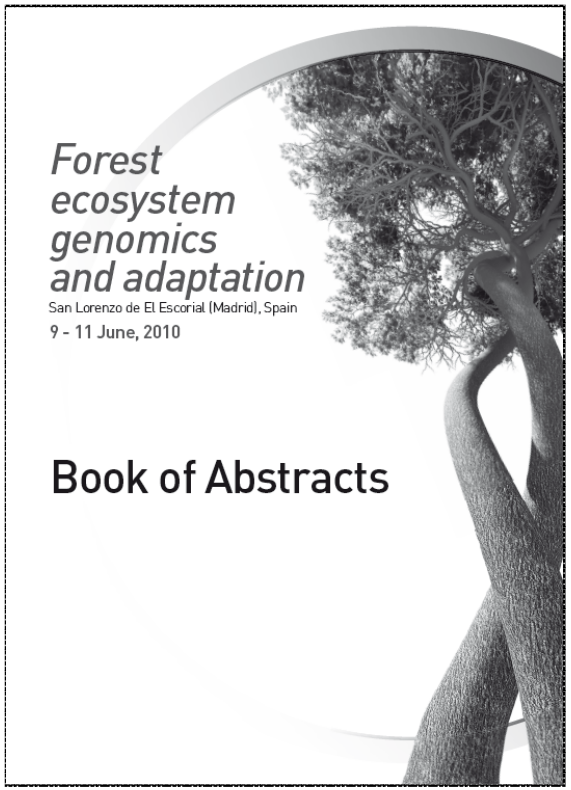
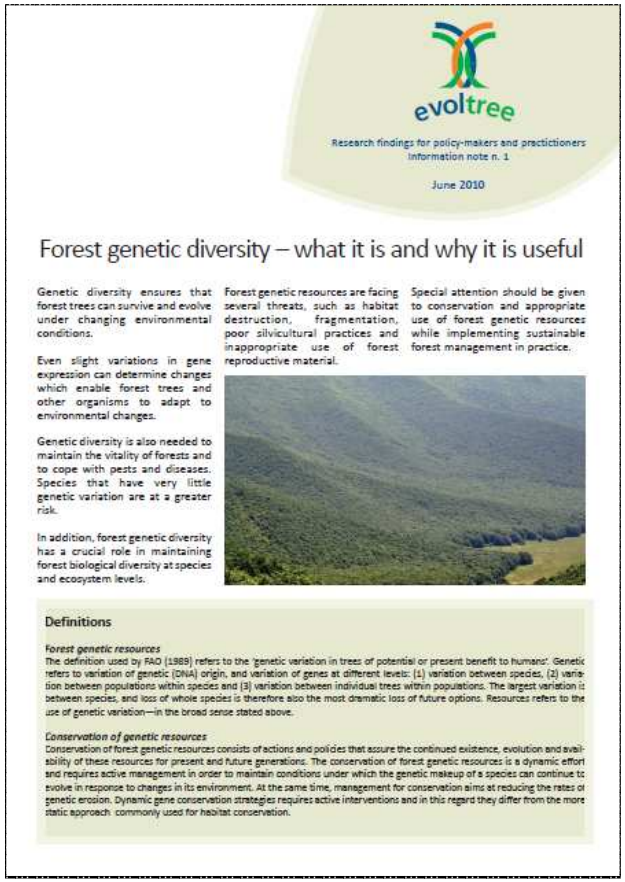


www.evoltree.eu

Information notes: “Research findings for policy makers and practitioners” - 4-page fact sheets



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Research findings for policy-makers and practictioners
Information note n. 1

June 2010

Forest genetic diversity – what it is and why it is useful

Genetic diversity ensures that forest trees can survive and evolve under changing environmental conditions.

Even slight variations in gene expression can determine changes which enable forest trees and other organisms to adapt to environmental changes.

Genetic diversity is also needed to maintain the vitality of forests and to cope with pests and diseases. Species that have very little genetic variation are at a greater risk.

In addition, forest genetic diversity has a crucial role in maintaining forest biological diversity at species and ecosystem levels.

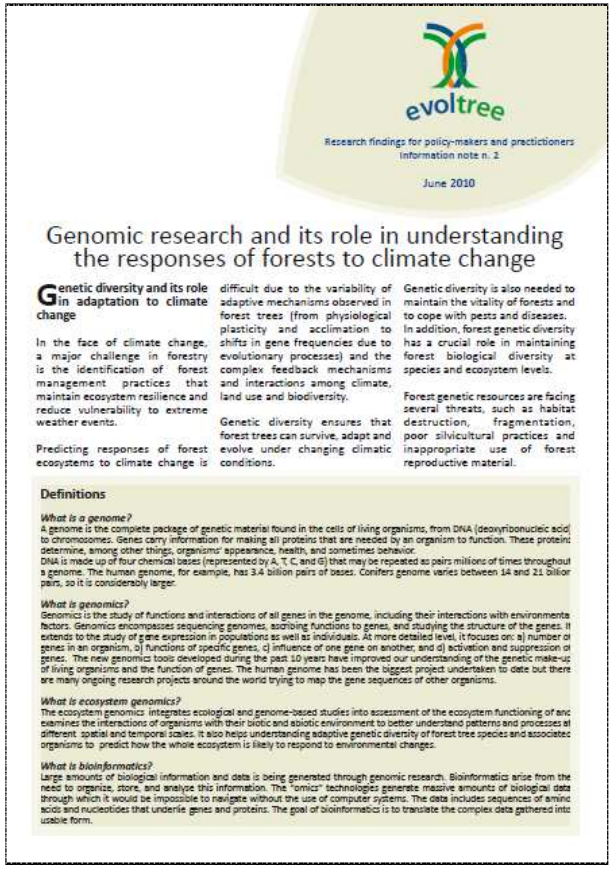
Forest genetic resources are facing several threats, such as habitat destruction, fragmentation, poor silvicultural practices and inappropriate use of forest reproductive material.

Special attention should be given to conservation and appropriate use of forest genetic resources while implementing sustainable forest management in practice.

Definitions

Forest genetic resources
The definition used by FAO (1989) refers to the 'genetic variation in trees of potential or present benefit to humans'. Genetic refers to variation of genetic (DNA) origin, and variation of genes at different levels: (1) variation between species, (2) variation between populations within species and (3) variation between individual trees within populations. The largest variation is between species, and loss of whole species is therefore also the most dramatic loss of future options. Resources refers to the use of genetic variation—in the broad sense stated above.

Conservation of genetic resources
Conservation of forest genetic resources consists of actions and policies that assure the continued existence, evolution and availability of these resources for present and future generations. The conservation of forest genetic resources is a dynamic effort and requires active management in order to maintain conditions under which the genetic makeup of a species can continue to evolve in response to changes in its environment. At the same time, management for conservation aims at reducing the rates of genetic erosion. Dynamic gene conservation strategies requires active interventions and in this regard they differ from the more static approach commonly used for habitat conservation.



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Research findings for policy-makers and practictioners
Information note n. 2

June 2010

Genomic research and its role in understanding the responses of forests to climate change

Genetic diversity and its role in adaptation to climate change

In the face of climate change, a major challenge in forestry is the identification of forest management practices that maintain ecosystem resilience and reduce vulnerability to extreme weather events.

Predicting responses of forest ecosystems to climate change is difficult due to the variability of adaptive mechanisms observed in forest trees (from physiological plasticity and acclimation to shifts in gene frequencies due to evolutionary processes) and the complex feedback mechanisms and interactions among climate, land use and biodiversity.

Genetic diversity ensures that forest trees can survive, adapt and evolve under changing climatic conditions.

Genetic diversity is also needed to maintain the vitality of forests and to cope with pests and diseases. In addition, forest genetic diversity has a crucial role in maintaining forest biological diversity at species and ecosystem levels.

Forest genetic resources are facing several threats, such as habitat destruction, fragmentation, poor silvicultural practices and inappropriate use of forest reproductive material.

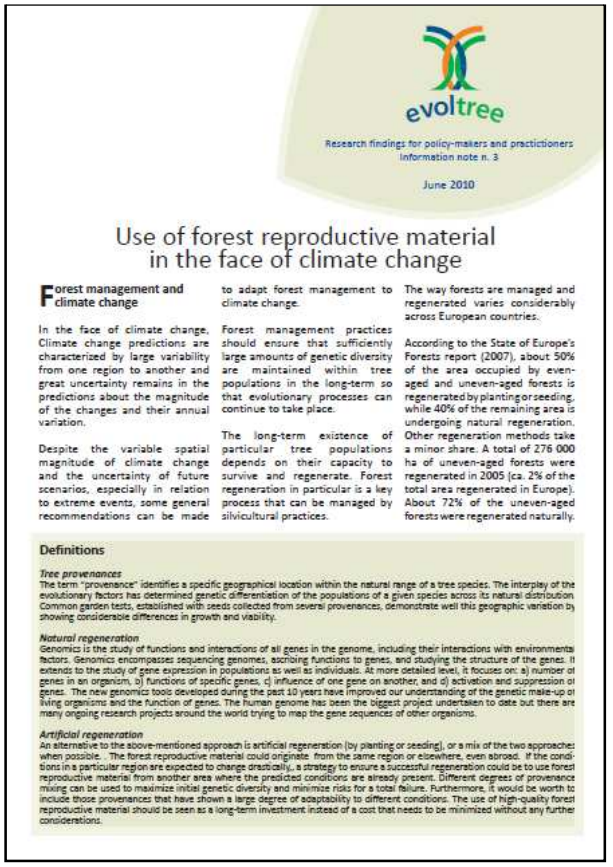
Definitions

What is a genome?
A genome is the complete package of genetic material found in the cells of living organisms, from DNA (deoxyribonucleic acid) to chromosomes. Genes carry information for making all proteins that are needed by an organism to function. These proteins determine, among other things, organisms' appearance, health, and sometimes behavior.
DNA is made up of four chemical bases (represented by A, T, C, and G) that may be repeated as pairs millions of times throughout a genome. The human genome, for example, has 3.4 billion pairs of bases. Conifers genome varies between 14 and 21 billion pairs, so it is considerably larger.

What is genomics?
Genomics is the study of functions and interactions of all genes in the genome, including their interactions with environmental factors. Genomics encompasses sequencing genomes, ascribing functions to genes, and studying the structure of the genes. It extends to the study of gene expression in populations as well as individuals. At more detailed level, it focuses on: a) number of genes in an organism, b) functions of specific genes, c) influence of one gene on another, and d) activation and suppression of genes. The new genomics tools developed during the past 10 years have improved our understanding of the genetic make-up of living organisms and the function of genes. The human genome has been the biggest project undertaken to date but there are many ongoing research projects around the world trying to map the gene sequences of other organisms.

What is ecosystem genomics?
The ecosystem genomics integrates ecological and genome-based studies into assessment of the ecosystem functioning of and examines the interactions of organisms with their biotic and abiotic environment to better understand patterns and processes at different spatial and temporal scales. It also helps understanding adaptive genetic diversity of forest tree species and associates organisms to predict how the whole ecosystem is likely to respond to environmental changes.

What is bioinformatics?
Large amounts of biological information and data is being generated through genomic research. Bioinformatics arise from the need to organize, store, and analyse this information. The "omics" technologies generate massive amounts of biological data through which it would be impossible to navigate without the use of computer systems. The data includes sequences of amino acids and nucleotides that underlie genes and proteins. The goal of bioinformatics is to translate the complex data gathered into usable form.



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Research findings for policy-makers and practictioners
Information note n. 3

June 2010

Use of forest reproductive material in the face of climate change

Forest management and climate change

In the face of climate change, Climate change predictions are characterized by large variability from one region to another and great uncertainty remains in the predictions about the magnitude of the changes and their annual variation.

Despite the variable spatial magnitude of climate change and the uncertainty of future scenarios, especially in relation to extreme events, some general recommendations can be made to adapt forest management to climate change.

Forest management practices should ensure that sufficiently large amounts of genetic diversity are maintained within tree populations in the long-term so that evolutionary processes can continue to take place.

The long-term existence of particular tree populations depends on their capacity to survive and regenerate. Forest regeneration in particular is a key process that can be managed by silvicultural practices.

The way forests are managed and regenerated varies considerably across European countries.

According to the State of Europe's Forests report (2007), about 50% of the area occupied by even-aged and uneven-aged forests is regenerated by planting or seeding, while 40% of the remaining area is undergoing natural regeneration. Other regeneration methods take a minor share. A total of 276 000 ha of uneven-aged forests were regenerated in 2005 (ca. 2% of the total area regenerated in Europe). About 72% of the uneven-aged forests were regenerated naturally.

Definitions

Tree provenances
The term "provenance" identifies a specific geographical location within the natural range of a tree species. The interplay of the evolutionary factors has determined genetic differentiation of the populations of a given species across its natural distribution. Common garden tests, established with seeds collected from several provenances, demonstrate well this geographic variation by showing considerable differences in growth and viability.

Natural regeneration
Genomics is the study of functions and interactions of all genes in the genome, including their interactions with environmental factors. Genomics encompasses sequencing genomes, ascribing functions to genes, and studying the structure of the genes. It extends to the study of gene expression in populations as well as individuals. At more detailed level, it focuses on: a) number of genes in an organism, b) functions of specific genes, c) influence of one gene on another, and d) activation and suppression of genes. The new genomics tools developed during the past 10 years have improved our understanding of the genetic make-up of living organisms and the function of genes. The human genome has been the biggest project undertaken to date but there are many ongoing research projects around the world trying to map the gene sequences of other organisms.

Artificial regeneration
An alternative to the above-mentioned approach is artificial regeneration (by planting or seeding), or a mix of the two approaches when possible. . The forest reproductive material could originate from the same region or elsewhere, even abroad. If the conditions in a particular region are expected to change drastically, a strategy to ensure a successful regeneration could be to use forest reproductive material from another area where the predicted conditions are already present. Different degrees of provenance mixing can be used to maximize initial genetic diversity and minimize risks for a total failure. Furthermore, it would be worth to include those provenances that have shown a large degree of adaptability to different conditions. The use of high-quality forest reproductive material should be seen as a long-term investment instead of a cost that needs to be minimized without any further considerations.

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Third Stakeholder Group Meeting (June 2010)

The Third Stakeholder Group Meeting of EVOLTREE took place in June 2010 in San Lorenzo de El Escorial (49 Km from Madrid, Spain).

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Second Stakeholder Group Meeting (September 2009)

The Second Stakeholder Group Meeting of EVOLTREE took place from September 16th - 17th, 2009 Eisenstadt in Austria.

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World Forest Week (March 2009)

Between March 16th and 20th, over 550 participants gathered at FAO in occasion of the 19th session of the United Nations Food and Agriculture Organization's (FAO) Committee on Forestry (COFO).

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European Forest Week (October 2008)

On October 20th - 24th, 2008, over 100 forest-related events were organized in 30 countries to celebrate the first European Forest Week.

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First Stakeholder Group Meeting (February 2008)

The First Stakeholder Group Meeting of EVOLTREE took place from February 7th - 8th, 2008 in Mandelieu-La Napoule in France.

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Full list of events and activities